Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Probable post-traumatic stress disorder after miscarriage: psychological, social, and healthcare-related factors in a mixed-methods study

Yuxin Ding
West China Second University Hospital of Sichuan University
Juan Zhao
West China Second University Hospital of Sichuan University
Yalin Zhang
West China Second University Hospital of Sichuan University
Yan Zuo
West China Second University Hospital of Sichuan University
Shanshan Wu
West China Second University Hospital of Sichuan University
Wei Zheng
West China Second University Hospital of Sichuan University
Chunyi Yan
yanscu@outlook.com
West China Second University Hospital of Sichuan University
Xinru Liu
West China Second University Hospital of Sichuan University

Research Article

Keywords: Miscarriage, Post-traumatic stress disorder, Maternal mental health, Social support, Stigma, Patient-centered care, Healthcare communication, Mixed-methods study

Posted Date: June 18th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9583675/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background: Miscarriage is commonly managed as a short-term obstetric condition, yet its psychological consequences may extend beyond physical recovery. This study aimed to estimate the prevalence of probable post-traumatic stress disorder (PTSD) after miscarriage and to examine psychological, social, and healthcare-related factors shaping PTSD symptom severity and recovery experiences.

Methods: A theory-informed sequential mixed-methods study was conducted at the Post Abortion Care clinic of a tertiary Grade-A women's and children's hospital in Sichuan Province, China. In the quantitative phase, 293 women who had experienced miscarriage before 20 completed weeks of gestation completed a digital survey assessing PTSD symptoms, psychological resilience, perceived social support, rumination, coping style, distress disclosure, self-efficacy, anxiety, depression, and post-traumatic growth. Probable PTSD was defined as a Post-traumatic Stress Disorder Checklist–Civilian Version score of 38 or higher. Between-group comparisons, Spearman correlations, and hierarchical multivariable linear regression models were used. In the qualitative phase, nine women participated in semi-structured interviews, which were analyzed thematically and integrated with quantitative findings.

Results: The mean PCL-C score was 33.5 ± 12.1, and 95 women (32.4%) screened positive for probable PTSD. Women with probable PTSD had lower psychological resilience than those without probable PTSD (55.4 ± 12.7 vs. 66.4 ± 16.4) and lower perceived social support (59.3 ± 14.0 vs. 66.3 ± 13.8). Higher resilience and perceived social support were associated with lower PTSD symptom severity, while intrusive rumination showed the strongest positive association. Hierarchical regression showed that sociodemographic and reproductive variables alone explained little variance in PTSD symptom severity (adjusted $R^2 = 0.007$), whereas adding healthcare-related, psychosocial, and psychological process variables increased explanatory power (adjusted $R^2 = 0.161$ and 0.538). Qualitative interviews identified four themes: self-regulation after miscarriage, partner and family support, social safety and stigma, and healthcare communication and care-process burden. These findings contextualized the quantitative associations and highlighted modifiable family, social, and health-service factors.

Conclusions: Probable PTSD was common after miscarriage and was shaped by more than individual psychological vulnerability. Post-miscarriage care should move beyond procedure-centered management toward trauma-informed, partner- and family-sensitive, and patient-centered support that includes psychological screening, clear communication, stigma reduction, and attention to care-process burden.

Introduction

Miscarriage is a common reproductive event, but its psychological consequences are often underestimated in routine clinical care (1). Clinical management usually focuses on confirming the diagnosis, selecting medical or surgical treatment, preventing complications, and counselling for future pregnancy(2–5). For many women, however, miscarriage is not only a biological event but also the sudden loss of an anticipated child and a disruption of reproductive expectations, family plans, and

personal identity (6). The experience may be accompanied by uncertainty about why the loss occurred, fear of recurrence, concern about future fertility, and self-blame(7). Previous studies have shown that miscarriage may be followed by substantial psychological morbidity, including post-traumatic stress, anxiety, depression, grief, and impaired wellbeing(8). These findings suggest that miscarriage should not be managed only as a short-term obstetric condition, but also as a potentially traumatic reproductive experience requiring psychological recognition and support(9).

Among post-miscarriage psychological outcomes, post-traumatic stress disorder (PTSD) symptoms deserve specific attention. Miscarriage can involve sudden diagnosis, distressing medical encounters, intrusive thoughts, avoidance of reminders, heightened arousal, and persistent concerns about future pregnancy. In a multicenter prospective cohort, Farren et al. reported high levels of post-traumatic stress, anxiety, and depression after miscarriage or ectopic pregnancy, with clinically relevant symptoms persisting for months in some women (10). A review of the psychological impact of miscarriage similarly concluded that emotional morbidity is common but remains insufficiently recognized in clinical practice (1). However, PTSD symptoms after miscarriage are not always routinely screened, and women who appear physically recovered may continue to experience substantial psychological distress(11).

Existing research has identified several factors associated with psychological distress after pregnancy loss, including resilience, coping resources, partner communication, and perceived social support (9). These factors are important, but they may not fully explain how women experience and recover from miscarriage. Psychological resilience may reduce vulnerability to PTSD symptoms, but resilience is unlikely to operate in isolation(12). Women's ability to regulate distress may depend on whether they receive understandable medical explanations, whether their partners provide emotional and practical support, and whether their families respond in a non-blaming and non-intrusive way(13). Similarly, although perceived social support is usually considered protective, qualitative evidence suggests that support after miscarriage can be complex(11). Support from partners, friends, or people with similar experiences can reduce loneliness and promote recovery, whereas silence, minimization, awkward comments, repeated questioning, or implied blame may intensify distress(14). Therefore, PTSD symptoms after miscarriage need to be understood beyond individual psychological vulnerability or the simple presence of social support(15).

Sociocultural and healthcare contexts may further shape women's psychological experiences after miscarriage. In family-oriented settings, miscarriage may be experienced not only as an individual medical event but also as a relational event involving reproductive expectations, future fertility concerns, and perceived judgement from others(16). Studies of pregnancy loss and reproductive experiences in Chinese settings suggest that women's emotional responses may be influenced by family expectations, cultural beliefs, and perceived stigma (17). Misconceptions about the causes of miscarriage may contribute to guilt, shame, and isolation; public health discussions have also emphasized that stigma and shame after baby loss remain barriers to open communication and support(18). Healthcare experience is another potentially modifiable factor. Women and their partners often value clear information, empathic communication, continuity of care, and individualized support from healthcare

professionals(14, 19). Conversely, emotionally distant communication, fragmented care pathways, prolonged waiting, repeated visits, and insufficient explanation may compound distress. A qualitative study from China reported unmet emotional needs in interactions between women experiencing pregnancy loss and obstetric nursing staff, highlighting the importance of sensitive communication and supportive care(20).

Taken together, the existing literature suggests that PTSD symptoms after miscarriage are shaped by multiple levels of influence, including individual psychological resources, partner and family relationships, sociocultural expectations, stigma, and healthcare-system experiences. However, relatively few studies have integrated these dimensions within a single empirical framework. A mixed-methods approach is useful because quantitative data can estimate the burden of probable PTSD and identify associated factors, while qualitative data can contextualize how women interpret the loss, regulate distress, receive support, encounter stigma, and experience healthcare services.

To address these gaps, this study used a theory-informed sequential mixed-methods design to examine probable PTSD and PTSD symptoms among women after miscarriage. The quantitative phase aimed to estimate the prevalence of probable PTSD and identify associated sociodemographic, reproductive, psychological, and social-support factors. The qualitative phase, guided by the Eco-Social Trauma Intervention Model, aimed to contextualize and expand the quantitative findings by exploring women's experiences of self-regulation, partner and family support, stigma, healthcare communication, and care-process burden(8). By integrating quantitative and qualitative findings, this study sought to develop a multilevel understanding of how individual, relational, sociocultural, and healthcare-related factors shape PTSD symptoms after miscarriage.

Methods

Study design

This study used a theory-informed sequential mixed-methods design. The quantitative phase was a cross-sectional survey designed to estimate the prevalence of probable post-traumatic stress disorder (PTSD) and to identify factors associated with PTSD symptom severity after miscarriage. The qualitative phase consisted of semi-structured interviews conducted after the survey to contextualize and expand the quantitative findings. The qualitative component was guided by the Eco-Social Trauma Intervention Model, which emphasizes trauma recovery across self-regulation, interpersonal relationships, social safety, and support systems(8). The study design and integration process were also informed by mixed-methods reporting principles, which emphasize the need to specify quantitative, qualitative, and integrated objectives and to clarify how different forms of data are combined(21).

The qualitative interviews were not designed to provide a one-to-one explanation of each variable retained in the final regression models. Rather, they were used to explore women's lived experiences of emotional regulation, partner and family support, stigma, healthcare communication, and care-process burden after miscarriage.

Setting and participants

The study was conducted at the Post Abortion Care clinic of a tertiary Grade-A women's and children's hospital in Sichuan Province, China. Women were eligible if they: (1) had experienced miscarriage before 20 completed weeks of gestation; (2) were aged 18 years or older; and (3) were able to understand the study information and provide informed consent. Women were excluded if they had other forms of early pregnancy loss, such as ectopic pregnancy, molar pregnancy, or resolved pregnancy of unknown location; cognitive impairment; or a previously diagnosed psychiatric disorder.

In the quantitative phase, convenience sampling was used to recruit participants between February 10 and July 10, 2025. Of 308 women approached, five did not meet the inclusion criteria, six declined participation, and four questionnaire was excluded because of invalid or incomplete responses, leaving 293 valid questionnaires for analysis. In the qualitative phase, purposive sampling was used to select participants from the same clinical setting between April 1 and July 28, 2025. Sampling aimed to capture variation in age, reproductive history, insurance status, and perceived psychological distress. Nine women completed semi-structured interviews.

Quantitative data collection and measures

Quantitative data were collected using a digital questionnaire completed via WeChat under the guidance of trained researchers. The questionnaire collected sociodemographic characteristics, reproductive and medical history, and psychological measures.

PTSD symptoms were assessed using the Post-traumatic Stress Disorder Checklist–Civilian Version (PCL-C) (22). The PCL-C is a self-report measure widely used to assess PTSD symptoms, with items covering re-experiencing, avoidance or numbing, and hyperarousal symptoms (23). In this study, the PCL-C total score ranged from 17 to 85, with higher scores indicating more severe PTSD symptoms. Probable PTSD was defined as a PCL-C total score of 38 or higher(24).

Psychological resilience was assessed using the Chinese version of the Connor–Davidson Resilience Scale (CD-RISC), a widely used measure of resilience, with higher scores indicating greater psychological resilience(25). Perceived social support was measured using the Perceived Social Support Scale (PSSS), which assesses support from family, friends, and significant others (26).

Posttraumatic growth was assessed using the Chinese version of the Posttraumatic Growth Inventory (C-PTGI)(27), which was translated and revised from the original PTGI developed by Tedeschi(28). Permission for academic use of the original PTGI was obtained from Professor Richard G. Tedeschi. The Chinese version has been previously published and psychometrically evaluated in Chinese populations(29). The C-PTGI consists of 20 items rated on a 6-point Likert scale from 0 to 5, with total scores ranging from 0 to 100; higher scores indicate greater posttraumatic growth. Additional psychological measures included the Chinese Event-Related Rumination Inventory (C-ERRI), Simplified Coping Style Questionnaire (SCSQ), Distress Disclosure Index (DDI), General Self-Efficacy Scale (GSES),

Self-Rating Anxiety Scale (SAS), and Self-Rating Depression Scale (SDS) (2,29–32).SAS and SDS were used to describe co-occurring psychological symptom burden and were not included in the main regression models because of their conceptual overlap with PTSD symptoms.

In the present sample, all psychological scales showed acceptable to excellent internal consistency. Cronbach's α values were 0.934 for C-PTGI, 0.947 for PCL-C, 0.962 for CD-RISC, 0.840 for SAS, 0.856 for SDS, 0.972 for PSSS total score, 0.955 for PSSS-family support, 0.961 for PSSS-friend support, 0.922 for PSSS-significant others support, 0.967 for C-ERRI total score, 0.972 for C-ERRI-intrusive rumination, 0.945 for C-ERRI-deliberate rumination, 0.923 for SCSQ total score, 0.940 for SCSQ-positive coping, 0.790 for SCSQ-negative coping, 0.866 for DDI, and 0.960 for GSES.

Qualitative data collection and analysis

Semi-structured interviews were conducted to explore women's experiences of miscarriage-related distress and recovery. The interview guide was developed according to the Eco-Social Trauma Intervention Model and focused on emotional responses, coping, family reactions, social attitudes toward miscarriage, support resources, and healthcare experiences (8). Interviews were conducted by three trained researchers, audio-recorded with permission, and transcribed verbatim. Interviews lasted 20 to 42 minutes.

Qualitative data were analyzed using a thematic approach informed by Colaizzi's descriptive phenomenological method(33). Two researchers independently read the transcripts, identified meaningful statements, generated initial codes, and grouped related codes into subthemes and broader themes. Coding discrepancies were resolved through team discussion and by returning to the original transcripts. NVivo 11.0 was used to assist data organization. Reflexive notes and regular team discussions were used to enhance analytic credibility and reduce researcher bias.

Quantitative data analysis

Quantitative analyses were performed using IBM SPSS Statistics version 26.0. Continuous variables were summarized as means and standard deviations or medians and interquartile ranges, as appropriate. Categorical variables were summarized as frequencies and percentages. Participants were divided into two groups according to PCL-C score: <38 and ≥38(24). Between-group comparisons were conducted using Student's t test or Mann–Whitney U test for continuous variables and chi-square test or Fisher's exact test for categorical variables.

Spearman correlation analyses were used to examine associations between PCL-C total score and psychological scale scores. Multivariable linear regression was used to identify factors associated with PTSD symptom severity, with PCL-C total score as the dependent variable. A hierarchical modeling strategy was applied. Model 1 included sociodemographic and reproductive variables. Model 2 additionally included medical payment status, CD-RISC total score, and PSSS total score. Model 3 further included psychological process variables, including C-PTGI, C-ERRI, SCSQ, DDI, and GSES. Model 3 was

considered exploratory because these psychological process variables may represent concurrent psychological responses rather than clear antecedent predictors. Multicollinearity was assessed using variance inflation factors. A two-sided P value <0.05 was considered statistically significant.

Mixed-methods integration

Quantitative and qualitative findings were integrated at the interpretation and reporting stage using a joint display, an approach commonly used in mixed-methods research to compare, connect, and interpret findings from different data sources(21). Integration focused on convergence, complementarity, and expansion between the two data sources. Convergence referred to qualitative themes that supported broad quantitative findings; complementarity referred to qualitative findings that provided contextual explanation for quantitative patterns; and expansion referred to qualitative findings that identified domains not directly measured in the survey, such as stigma and healthcare communication.

Integrated findings were used to develop a multilevel understanding of PTSD symptoms after miscarriage, linking individual psychological resources, partner and family support, sociocultural pressures, and healthcare-system experiences.

Ethical considerations

The study was approved by the Ethics Committee of West China Second University Hospital, Sichuan University (Medical Research 2025 Approval No.103). All procedures were conducted in accordance with the Declaration of Helsinki and relevant Chinese regulations. All participants received information about the study purpose, voluntary participation, confidentiality, and the right to withdraw at any time without affecting their medical care. Written informed consent was obtained before questionnaire completion and interviews. All data were anonymized before analysis.

Results

Participant characteristics and probable PTSD

A total of 293 women after miscarriage were included in the quantitative analysis. The mean age was 32.2 ± 4.0 years. Most participants lived in urban areas, had a bachelor's degree or above, were employed, reported a family monthly income per capita of ≥ 5000 RMB, had no living children, conceived naturally, and had experienced one miscarriage (Table 1).

The mean PCL-C score was 33.5 ± 12.1. Using the cut-off score of 38, 95 participants (32.4%) screened positive for probable PTSD, while 198 participants (67.6%) scored below the cut-off. Compared with women who did not screen positive for probable PTSD, those who screened positive had lower psychological resilience scores, as measured by the CD-RISC (55.4 ± 12.7 vs. 66.4 ± 16.4, P < 0.05), and lower perceived social support scores, as measured by the PSSS (59.3 ± 14.0 vs. 66.3 ± 13.8, P < 0.05). The proportion of uninsured or self-paid participants was also higher among women who screened

positive for probable PTSD than among those who did not (29.5% vs. 16.7%). Most sociodemographic and reproductive variables did not differ significantly between groups. Detailed reproductive and medical characteristics are presented in Supplementary Table S1.

Table 1
Characteristics of participants by probable PTSD status

Variable	Total (N = 293)	PCL-C < 38 (n = 198)	PCL-C ≥ 38 (n = 95)
Age, years	32.2 ± 4.0	32.2 ± 3.9	32.4 ± 4.2
Residence			
Urban	262 (89.4)	176 (88.9)	86 (90.5)
County/town or rural	31 (10.6)	22 (11.1)	9 (9.5)
Education level			
High school/junior college or below	99 (33.8)	68 (34.3)	31 (32.6)
Bachelor's degree or above	194 (66.2)	130 (65.7)	64 (67.4)
Employment status			
Unemployed	58 (19.8)	34 (17.2)	24 (25.3)
Employed	235 (80.2)	164 (82.8)	71 (74.7)
Family monthly income per capita			
<5000 RMB	60 (20.5)	35 (17.7)	25 (26.3)
≥5000 RMB	233 (79.5)	163 (82.3)	70 (73.7)
Insurance status			
Insured	232 (79.2)	165 (83.3)	67 (70.5)
Uninsured/self-paid	61 (20.8)	33 (16.7)	28 (29.5)
Planned pregnancy			
Yes	271 (92.5)	182 (91.9)	89 (93.7)
No	22 (7.5)	16 (8.1)	6 (6.3)
Having living children			
Yes	69 (23.5)	48 (24.2)	21 (22.1)
No	224 (76.5)	150 (75.8)	74 (77.9)
Conception method			
Natural conception	247 (84.3)	166 (83.8)	81 (85.3)
Assisted reproduction	46 (15.7)	32 (16.2)	14 (14.7)
Number of miscarriages			

Variable	Total (N = 293)	PCL-C < 38 (n = 198)	PCL-C ≥ 38 (n = 95)
1	219 (74.7)	153 (77.3)	66 (69.5)
2–3	66 (22.5)	42 (21.2)	24 (25.3)
≥3	8 (2.7)	3 (1.5)	5 (5.3)
PCL-C score	33.5 ± 12.1	26.4 ± 5.9	48.4 ± 7.2*
CD-RISC score	62.8 ± 16.1	66.4 ± 16.4	55.4 ± 12.7*
PSSS score	64.0 ± 14.2	66.3 ± 13.8	59.3 ± 14.0*

*P <0.05.

PCL-C, Post-traumatic Stress Disorder Checklist–Civilian Version; PTSD, post-traumatic stress disorder; CD-RISC, Connor–Davidson Resilience Scale; PSSS, Perceived Social Support Scale.

Psychological correlates of PTSD symptom severity

Psychological scale scores and their correlations with PTSD symptom severity are shown in Table 2. Higher psychological resilience and perceived social support were both associated with lower PCL-C scores. The CD-RISC total score showed a moderate negative correlation with PCL-C score ($r = -0.400$, $P < 0.05$), while the PSSS total score showed a weaker but significant negative correlation ($r = -0.235$, $P < 0.05$). All PSSS subdomains, including family support, friend support, and support from significant others, were negatively correlated with PCL-C scores.

Rumination-related variables were positively associated with PCL-C scores. The C-ERRI total score was strongly correlated with PCL-C score, with the strongest correlation observed for intrusive rumination ($r = 0.647$, $P < 0.05$). Negative coping was positively associated with PCL-C score, whereas positive coping, distress disclosure, and general self-efficacy were negatively associated with PCL-C score. Anxiety and depressive symptoms were also strongly correlated with PCL-C score. The C-PTGI total score showed only a weak and non-significant correlation with PCL-C score, suggesting that post-traumatic growth was not simply the opposite of PTSD symptoms in this sample.

Table 2
Psychological scale scores and correlations with PCL-C total score

Scale	Mean ± SD	Spearman r with PCL-C
CD-RISC total score	62.8 ± 16.1	-0.400*
PSSS total score	64.0 ± 14.2	-0.235*
PSSS family support	22.5 ± 5.0	-0.254*
PSSS friend support	20.9 ± 5.1	-0.223*
PSSS other support	20.7 ± 5.0	-0.171*
C-PTGI total score	55.5 ± 17.4	0.096*
C-ERRI total score	21.8 ± 12.9	0.603*
C-ERRI intrusive rumination	10.4 ± 7.5	0.647*
C-ERRI deliberate rumination	11.4 ± 6.6	0.488*
SCSQ positive coping	23.2 ± 7.6	-0.147*
SCSQ negative coping	11.2 ± 4.5	0.262*
DDI total score	41.9 ± 6.8	-0.319*
GSES total score	27.2 ± 6.3	-0.149*
SAS standard score	44.1 ± 9.3	0.674*
SDS standard score	48.3 ± 10.5	0.587*

*P<0.05

PCL-C, Post-traumatic Stress Disorder Checklist–Civilian Version; CD-RISC, Connor–Davidson Resilience Scale; PSSS, Perceived Social Support Scale; C-PTGI, Post-traumatic Growth Inventory; C-ERRI, Chinese Event-Related Rumination Inventory; SCSQ, Simplified Coping Style Questionnaire; DDI, Distress Disclosure Index; GSES, General Self-Efficacy Scale; SAS, Self-Rating Anxiety Scale; SDS, Self-Rating Depression Scale.

Multivariable models for PTSD symptom severity

Multivariable linear regression models were constructed to identify factors associated with PTSD symptom severity, with PCL-C total score as the dependent variable (Table 3). 293 participants were included in the regression analyses.

Model 1, which included sociodemographic and reproductive variables, had limited explanatory power (adjusted $R^2 = 0.007$), suggesting that these variables alone explained little variation in PTSD symptom severity. After medical payment status, psychological resilience, and perceived social support were added in Model 2, the explanatory power increased to an adjusted R^2 of 0.161. Higher CD-RISC score was independently associated with lower PCL-C score (B = -0.22, 95% CI: -0.31 to -0.13, P < 0.05). Higher

PSSS score was also independently associated with lower PCL-C score (B = -0.13, 95% CI: -0.24 to -0.02, P = 0.017). Compared with uninsured or self-paid participants, insured participants tended to have lower PCL-C scores, although this association did not reach conventional statistical significance after adjustment (B = -3.39, 95% CI: -6.95 to 0.18, P = 0.063). Recurrent miscarriage was associated with higher PCL-C scores but estimates for women with three or more miscarriages should be interpreted cautiously because of the small subgroup size.

Model 3 further included psychological process variables and was considered exploratory. The model explained substantially more variance in PCL-C score (adjusted R^2 = 0.538). CD-RISC and PSSS remained negatively associated with PCL-C score. Intrusive rumination showed the strongest positive association with PCL-C score (B = 0.83, 95% CI: 0.63 to 1.03, P < 0.05). Positive coping was negatively associated with PCL-C score, whereas negative coping was positively associated with PCL-C score. C-PTGI and GSES showed positive associations in this exploratory model; these findings should be interpreted cautiously because of potential overlap and suppression effects among psychological process variables.

Qualitative findings

Nine women participated in the qualitative interviews. Their mean age was 30.6 ± 5.0 years. Most had a bachelor's degree or above, had no living children, reported that the index pregnancy was planned, and conceived naturally. Seven participants had health insurance, whereas two were uninsured or self-paid (Table 4).

Four themes were identified from the interviews: self-regulation after miscarriage, partner and family support, social safety and stigma, and healthcare communication and care-process burden.

(i)Self-regulation after miscarriage

Participants described miscarriage as an emotionally overwhelming event. All participants reported crying when they first learned about the miscarriage, and several described crying or talking with their husbands as ways to release distress. One participant stated, "I was so disappointed… I cried and talked to my husband. One must let it out; crying works." (P6) Returning to ordinary life was also described as helpful by some women, although this was not always easy. One woman who had experienced her third miscarriage said, "I'm taking sick leave. Whenever I'm alone, all the bad emotions find me." (P2)

Table 3
Multivariable linear regression models for PTSD symptom severity (n = 293)

Variable	Model 1 B	95% CI	Model 2 B	95% CI	Model 3 B	95% CI
Intercept	33.71	15.00, 52.41*	53.00	34.53, 71.48*	23.01	7.61, 38.41*
Age, years	-0.10	-0.52, 0.32	-0.19	-0.59, 0.20	0.02	-0.28, 0.31
Education: senior high/junior college vs junior high or below	0.88	-7.83, 9.60	1.97	-6.05, 10.00	3.84	-2.18, 9.85
Education: bachelor's degree or above vs junior high or below	2.55	-6.33, 11.43	4.48	-3.71, 12.66	5.31	-0.82, 11.44
Income: 3000–4999 RMB vs < 3000 RMB	2.73	-5.34, 10.79	6.22	-1.27, 13.72	3.46	-2.13, 9.04
Income: 5000–9999 RMB vs < 3000 RMB	-1.81	-9.66, 6.03	2.08	-5.26, 9.42	-0.37	-5.88, 5.15
Income: >10000 RMB vs < 3000 RMB	-2.43	-10.47, 5.62	1.62	-5.89, 9.13	0.11	-5.51, 5.73
Employed vs unemployed	-0.58	-4.67, 3.51	0.90	-3.06, 4.85	-0.71	-3.67, 2.25
Residence: county/town vs urban	-1.16	-6.54, 4.22	-3.64	-8.69, 1.40	-1.29	-5.08, 2.50
Residence: rural vs urban	-5.79	-15.50, 3.91	-4.65	-13.59, 4.28	-0.14	-6.88, 6.60
Planned pregnancy: yes vs no	2.92	-2.80, 8.65	4.41	-0.88, 9.70	3.40	-0.54, 7.33
Having living children: yes vs no	-1.71	-5.75, 2.33	-0.13	-3.93, 3.66	0.53	-2.32, 3.39
Assisted reproduction vs natural conception	-0.84	-5.04, 3.37	0.02	-3.86, 3.90	-0.69	-3.62, 2.25
Number of miscarriages: 2–3 vs 1	2.77	-0.75, 6.30	3.50	0.23, 6.76*	2.93	0.49, 5.37*
Number of miscarriages: ≥3 vs 1	7.80	-1.04, 16.65	8.30	0.16, 16.44*	9.14	3.04, 15.25*
Insured vs uninsured/self-paid			-3.39	-6.95, 0.18	-1.11	-3.80, 1.59
CD-RISC total score			-0.22	-0.31, -0.13*	-0.13	-0.23, -0.04*

Variable	Model 1 B	95% CI	Model 2 B	95% CI	Model 3 B	95% CI
PSSS total score			-0.13	-0.24, -0.02*	-0.12	-0.21, -0.02*
C-PTGI total score					0.21	0.15, 0.28*
C-ERRI intrusive rumination					0.83	0.63, 1.03*
C-ERRI deliberate rumination					0.07	-0.14, 0.29
SCSQ positive coping					-0.29	-0.50, -0.09*
SCSQ negative coping					0.39	0.10, 0.68*
DDI total score					-0.18	-0.36, 0.01
GSES total score					0.25	0.02, 0.48*
Model N	293		293		293	
Adjusted R^2	0.007		0.161		0.538	

*P <0.05

CI, confidence interval; PCL-C, Post-traumatic Stress Disorder Checklist–Civilian Version; CD-RISC, Connor–Davidson Resilience Scale; PSSS, Perceived Social Support Scale; PTGI, Post-traumatic Growth Inventory; C-ERRI, Chinese Event-Related Rumination Inventory; SCSQ, Simplified Coping Style Questionnaire; DDI, Distress Disclosure Index; GSES, General Self-Efficacy Scale.

Reliable medical information was perceived as important for reducing uncertainty and self-blame. Several participants sought professional explanations or medical consultations. One participant said, “We booked an appointment with a genetics specialist.” (P4) Another stated, “Reading professional materials is the best way to understand miscarriage.” (P3) However, online information was often described as overwhelming and unreliable. One participant noted, “We know that things said on social media are not always right, but we do not have other reliable online resources.” (P8) Self-forgiveness was also important. Participants described gradually accepting that miscarriage could happen despite their efforts: “It’s just bad luck. When I look back, there was nothing else I could do to avoid this.” (P3)

(ii)Partner and family support

Spousal support was described as irreplaceable during the miscarriage experience. Participants valued their husbands’ presence during hospital visits, emotional comfort, and practical help. One woman said, “He was with me the whole time, taking blood tests, seeing doctors, and preparing for surgery.” (P7)

Another stated, “A comforting look, or an embrace, would make me feel safe, even without any words.” (P1)

Some women also described their husbands’ efforts to understand miscarriage or prepare for future pregnancy as reassuring. One participant said that her husband searched for scientific information to comfort her, even though he did not have a medical background. Others mentioned lifestyle changes, such as quitting smoking or exercising together before trying to conceive again. Open communication was also perceived as helpful. One participant said, “After a long talk with him, I felt relieved.” (P6) In contrast, avoidance of communication could maintain distress: “We haven’t really talked about it… I think we are both stuck in it.” (P2)

(iii)Social safety and stigma

Support from parents, friends, and relatives was helpful for some women but stressful for others. Some participants described visits, food, companionship, or attempts to distract them as comforting. However, excessive attention or repeated questioning was often experienced as an additional emotional burden. One participant said, “I haven’t told anyone else yet, not even my parents. I don’t think there’s anything others can do.” (P4) Another explained that her parents had been looking forward to the baby, and she worried that she might need to comfort them instead.

Stigma and fear of blame were particularly evident in relation to older relatives and the husband’s family. Some participants avoided disclosing the miscarriage because they feared being judged or blamed. One woman said, “They don’t know any better. They will think there’s something wrong with me.” (P4) Participants also suggested that basic scientific information about miscarriage for older family members could reduce blame and improve the family environment. One participant stated, “If only my mother-in-law heard what the doctor said, she wouldn’t blame me for this.” (P8)

(iv)Healthcare communication and care-process burden

Healthcare communication was another important theme. Some participants perceived healthcare providers as emotionally distant when communicating the diagnosis. One woman described the encounter as being told the “death sentence of the baby.” (P2) Participants wanted more individualized explanations about possible causes, future pregnancy preparation, and follow-up care. One participant said, “I would like doctors to provide more detailed guidance, or to clarify what caused the embryo to stop developing and what we should pay attention to in the future.” (P1)

Participants also wanted communication to be more understandable and humane. One woman stated, “I hope doctors would not use too many professional terms. If they could explain it in a way that ordinary people can understand, it might be easier to accept.” (P9) The care process itself could also prolong distress. One participant described repeated hospital visits and delays before surgery: “Because of the treatment of vaginitis, we had to go back and forth to the hospital for more than a week. If I could have

done most tests and treatment at a community hospital near my home, I would have had the operation sooner and returned to normal life earlier." (P9)

Table 4
Characteristics of participants in qualitative interviews (N = 9)

Variables	**n (%) or mean ± SD [range]**
Age, years	30.6 ± 5.0 [21, 37]
Education level	
Junior high school or below	1 (11.1)
Senior high school	1 (11.1)
Bachelor's degree or above	7 (77.8)
Insurance type	
National health insurance	6 (66.7)
Commercial insurance	1 (11.1)
Uninsured/self-paid	2 (22.2)
Having living children	
Yes	3 (33.3)
No	6 (66.7)
Planned pregnancy	
Yes	8 (88.9)
No	1 (11.1)
Conception method	
Natural conception	7 (77.8)
Assisted reproduction	2 (22.2)

Integrated mixed-methods findings

The integrated findings are presented in Table 5. Quantitative analyses showed that probable PTSD was common after miscarriage and was associated with lower resilience, lower perceived social support, and healthcare-related factors. The qualitative findings contextualized these patterns by showing how women experienced miscarriage as an event involving acute emotional distress, uncertainty, self-blame, and repeated attempts to regain control.

The qualitative findings converged with the quantitative associations involving resilience and social support. Emotional release, self-forgiveness, reliable medical explanations, spousal companionship, and open couple communication were perceived as helpful for recovery. At the same time, the interviews expanded the interpretation of social support by showing that support could be double-edged: partner support was usually protective, whereas intrusive attention or blame from parents and relatives could intensify distress.

The qualitative findings also identified domains not directly captured in the quantitative survey, including miscarriage-related stigma, fear of gossip, family blame, perceived indifference from healthcare providers, and insufficient medical explanation. Together, the integrated findings suggest that PTSD symptoms after miscarriage are shaped by individual psychological resources, relational dynamics, sociocultural pressures, and healthcare-system experiences.

Table 5
Joint display integrating quantitative and qualitative findings on probable PTSD and PTSD symptoms after miscarriage

Quantitative survey finding	Qualitative contextual insight	Role of integration	Integrated interpretation	Implication for public health practice and research
Probable PTSD was observed in 95 of 293 participants (32.4%) using the PCL-C cut-off of ≥ 38.	Participants described miscarriage as an emotionally overwhelming event, often involving crying, recurrent thoughts, and difficulty returning to ordinary life.	Complementarity / contextualization	The interview data contextualized the observed symptom burden by showing how women experienced miscarriage as an acute emotional and relational disruption.	Post-miscarriage services should include brief psychological screening, clear information, and early emotional support.
Higher resilience was associated with lower PCL-C scores in the adjusted model (Model 2: B = -0.22, P < 0.001).	Women described emotional release, self-forgiveness, returning to routines, and seeking reliable medical explanations as ways to regain control.	Convergence	The qualitative themes supported the quantitative association by illustrating how self-regulation and cognitive reframing may operate as resilience-related processes.	Provide structured psychoeducation, self-blame reduction, and brief coping-skills support after miscarriage.
Higher perceived social support was associated with lower PCL-C scores in Model 2 (B = -0.13, P = 0.017).	Spousal companionship and open communication were perceived as helpful, whereas intrusive attention, pressure, or blame from relatives could intensify distress.	Expansion	The interviews extended the survey finding by showing that support was heterogeneous: the source, timing, and quality of support may matter more than perceived support quantity.	Develop couple- and family-sensitive counselling that encourages non-blaming communication and avoids intrusive support.
Insurance status differed between probable PTSD groups in Table 1 and showed a	Some women described repeated hospital visits, prolonged care pathways, and insufficient	Partial complementarity	The qualitative findings provided healthcare-context insights that may partly illuminate the insurance/access	Streamline care pathways, clarify timelines and next steps, and reduce avoidable visits and waiting.

PCL-C, Post-traumatic Stress Disorder Checklist–Civilian Version; PTSD, post-traumatic stress disorder.

Quantitative survey finding	Qualitative contextual insight	Role of integration	Integrated interpretation	Implication for public health practice and research
protective trend in the adjusted model (insured vs uninsured/self-paid: B = -3.39, P = 0.063).	explanation as adding to emotional burden.		finding, but they should not be interpreted as a direct explanation of the final regression coefficient.	
Intrusive rumination was strongly associated with PCL-C scores in psychological-scale analyses and the exploratory psychological-process model.	Some interview accounts included persistent thoughts about the loss and distress when alone; however, the interviews were not designed to systematically examine rumination.	Limited convergence / exploratory	Intrusive cognition may be a proximal psychological process linked to PTSD symptoms, but this inference remains exploratory because the qualitative phase did not systematically examine rumination.	Future model-informed interviews should examine intrusive rumination, disclosure, and coping pathways more directly.
Miscarriage-related stigma, family blame, and healthcare communication were not directly measured in the quantitative survey.	Interviews revealed shame, fear of gossip, concern about blame from relatives, perceived indifference from healthcare providers, and insufficient medical explanation.	Expansion	The qualitative component identified sociocultural and healthcare-system domains that were under-measured in the survey but relevant to psychological recovery.	Future surveys should include stigma and healthcare-experience measures; clinical services should adopt trauma-informed communication.

PCL-C, Post-traumatic Stress Disorder Checklist–Civilian Version; PTSD, post-traumatic stress disorder.

Discussion

In this theory-informed mixed-methods study, 32.4% of women after miscarriage screened positive for probable PTSD based on the PCL-C cut-off (24). This finding indicates that miscarriage may be accompanied by substantial trauma-related psychological burden, even when clinical care is primarily focused on physical management and future pregnancy planning. Previous prospective studies and reviews have shown that miscarriage and other forms of early pregnancy loss can be followed by post-traumatic stress, anxiety, depression, and grief (7). Our findings are consistent with this literature and further suggest that PTSD symptoms after miscarriage deserve routine clinical attention. Because

probable PTSD in this study was identified using a self-report screening scale rather than a structured clinical interview, the prevalence should not be interpreted as a diagnostic rate. Nevertheless, the high screening proportion indicates that psychological assessment should be considered as part of post-miscarriage care.

Psychological resilience was one of the most stable factors associated with lower PTSD symptom severity. Women who screened positive for probable PTSD had lower CD-RISC scores, and resilience remained independently associated with lower PCL-C scores in adjusted regression models. This result is consistent with broader trauma literature suggesting that resilience may help individuals maintain or regain psychological functioning after highly stressful events (34). In the qualitative interviews, resilience was not expressed as a fixed personal trait, but as a process of self-regulation. Women described emotional release, self-forgiveness, returning to daily routines, and seeking reliable medical explanations as ways to regain control after miscarriage. This finding is compatible with the Eco-Social Trauma Intervention Model, which emphasizes recovery through self-regulation, relationships, social safety, and support systems(8). Clinically, this suggests that post-miscarriage care should not simply identify women as “resilient” or “non-resilient”; rather, healthcare providers can actively support resilience-related processes by normalizing emotional responses, reducing self-blame, providing understandable explanations, and offering coping guidance.

Perceived social support was also associated with lower PTSD symptom severity. This finding is in line with previous studies showing that social support can buffer psychological distress after miscarriage and pregnancy loss(9, 11, 15). In particular, our qualitative findings highlighted the central role of the husband or partner. Women valued companionship during hospital visits, emotional comfort, lifestyle changes, and open communication. These findings are consistent with qualitative evidence showing that partners are often perceived as central support figures after miscarriage(11), and with dyadic research suggesting that openness and communication are associated with better relationship functioning among women experiencing infertility or miscarriage(35). These results support the value of partner-inclusive counselling rather than counselling directed only at the woman.

However, our findings also show that social support after miscarriage is not uniformly beneficial. Although higher PSSS scores were associated with lower PCL-C scores, interviews revealed that repeated questioning, excessive attention, implied blame, or pressure from parents and relatives could intensify distress. This distinction between the amount and quality of support is important. Bellhouse et al. reported that women may experience both supportive and unsupportive social interactions after miscarriage, and that silence or lack of acknowledgement may deepen loneliness(11, 14). In family-oriented contexts, miscarriage may also be interpreted as a family event related to future fertility, reproductive expectations, and family responsibility. Studies from Chinese settings have suggested that women’s experiences of reproductive loss may be shaped by family expectations, cultural beliefs, and social judgement(Zheng et al., 2024). Therefore, interventions should not merely encourage “more support”; they should help partners and family members provide non-blaming, non-intrusive, and emotionally appropriate support.

Stigma and self-blame emerged as important qualitative findings. Some women avoided disclosing the miscarriage because they feared gossip, blame, or being viewed as physically defective. These findings are consistent with broader evidence that misconceptions about miscarriage are common and may contribute to guilt and shame(17). Public health discussions have also emphasized that stigma and shame after baby loss may prevent women and families from openly seeking support(18). In this study, stigma was not directly measured in the quantitative survey, but it clearly appeared in the interviews as a contextual factor that shaped psychological recovery(16). This indicates an important measurement gap. Future quantitative studies should include culturally appropriate measures of miscarriage-related stigma, perceived family judgement, and self-blame, particularly in settings where reproductive expectations are strongly embedded in family relationships.

Healthcare experience was another important domain. In the quantitative analysis, uninsured or self-paid participants were more common in the probable PTSD group, and insurance status showed a protective trend after adjustment. Although the qualitative interviews were not designed to directly explain the insurance coefficient in the regression model, they provided contextual insights into healthcare-related burden(14). Some women described repeated hospital visits, prolonged care pathways, insufficient explanations, and emotionally distant communication as adding to distress(15). This is consistent with patient-centered early pregnancy care literature, which shows that women and partners value clear information, continuity, individualized care, and empathic communication during early pregnancy complications(19). A qualitative study in China also found that women who experienced pregnancy loss had unmet emotional needs in interactions with obstetric nursing staff (20). These findings suggest that healthcare systems can influence psychological recovery not only through treatment effectiveness but also through communication quality, procedural efficiency, and emotional responsiveness.

The exploratory psychological-process model showed that intrusive rumination was strongly associated with PCL-C scores(36). This finding is clinically plausible because repetitive intrusive thoughts are closely related to trauma-related distress. However, it should be interpreted cautiously because of the cross-sectional design and conceptual overlap between intrusive rumination and PTSD symptoms. Similarly, the positive association between C-PTGI and PCL-C in the exploratory model should not be interpreted as evidence that post-traumatic growth increases PTSD symptoms. Rather, it may indicate that distress and perceived growth can coexist after miscarriage(37, 38). Women with greater psychological distress may engage in more intense cognitive processing of the loss, which may be associated with both suffering and attempts to find meaning. Therefore, clinicians should avoid using “growth” narratives to minimize women’s pain; emotional validation should come before expectations of positive adaptation(39, 40).

This study has several implications. First, screening for probable PTSD should be considered in post-miscarriage care, especially among women with low resilience, low perceived support, recurrent miscarriage, or prominent intrusive rumination. Second, psychological support should be embedded into routine reproductive healthcare rather than treated as an optional service. Third, partner- and family-sensitive counselling may be particularly useful, because family interactions can either support or

undermine recovery. Fourth, healthcare providers should use clear, non-blaming explanations and acknowledge emotional distress when communicating miscarriage diagnosis and treatment plans. Finally, services should reduce unnecessary waiting, repeated visits, and fragmented care pathways where possible.

Several limitations should be acknowledged. First, this was a single-center study conducted in a tertiary women's and children's hospital, and the sample mainly reflected women who accessed hospital-based care; findings may not generalize to women treated in primary care, rural settings, or hospitals with fewer reproductive-health resources. Second, the cross-sectional survey design precludes causal inference. Third, probable PTSD was assessed using the PCL-C rather than a structured clinical interview; therefore, findings should be interpreted as probable PTSD and PTSD symptom severity, not clinically diagnosed PTSD. Fourth, the qualitative interviews were guided by the theoretical framework and broad survey domains rather than by the final regression models; they should therefore be interpreted as contextual insights rather than direct explanations of every statistical association. Finally, partners and family members were not interviewed, although their roles emerged as important in women's accounts.

Conclusion

PTSD symptoms after miscarriage are shaped by more than individual psychological vulnerability. Lower resilience and lower perceived social support were associated with higher PTSD symptom severity, while qualitative findings showed that family interactions, stigma, healthcare communication, and care-process burden also shaped women's experiences. These findings support a shift from procedure-centered miscarriage care toward trauma-informed, partner- and family-sensitive, and patient-centered post-miscarriage support.

Declarations

Ethics approval and consent to participate This study was approved by the Ethics Committee of West China Second University Hospital, Sichuan University (Medical Research 2025 Approval No.103). All procedures were conducted in accordance with the Declaration of Helsinki and relevant Chinese regulations. Written informed consent was obtained from all participants prior to participation. **Clinical trial number:** not applicable.

Consent for publication Not applicable.

Availability of data and materials The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests The authors declare that they have no competing interests

Funding This study was supported by the Science and Technology Department of Sichuan Province (Fund No.: 2022NSFSC1486). There is a statistician on the author team: Chunyi Yan.

Authors' contributions

DYX: Conceptualization, Methodology, Interview, Software, Investigation, Data curation, Formal Analysis, Translation, Writing-original draft, Writing-review & Editing.

ZJ: Interview, Software, Data curation, Formal Analysis.

ZYL Conceptualization, Methodology, Writing-review & Editing.

ZY: Data curation, Translation, Writing-review & Editing.

WSS: Interview, Software, Investigation.

YCY: Conceptualization, Translation, Supervision, Validation, Writing-review & Editing.

LXR: Conceptualization, Methodology, Supervision, Validation, Writing-review & Editing.

Acknowledgements Not applicable.

References

1. Mendes DCG, Fonseca A, Cameirão MS. The psychological impact of Early Pregnancy Loss in Portugal: incidence and the effect on psychological morbidity. Front Public Health. 2023 Jun 22;11:1188060. doi:10.3389/fpubh.2023.1188060
2. Cann A, Calhoun L, Tedeschi R, Triplett K, Vishnevsky T, Lindstrom C. Assessing posttraumatic cognitive processes: the Event Related Rumination Inventory. Anxiety Stress Coping. 2011;24(2):137–56. doi:10.1080/10615806.2010.529901
3. Tedeschi RG, Shakespeare-Finch J, Taku K. Posttraumatic growth: Theory, research, and applications. Routledge; 2018.
4. Zung W. A self-rating depression scale. Arch Gen Psychiatry. 1965;12(1):63–70. doi:10.1001/archpsyc.1965.01720310065008
5. Zung W. A rating instrument for anxiety disorders. Psychosomatics. 1971;12(6):371–9. doi:10.1016/S0033-3182(71)71479-0
6. Farren J, Jalmbrant M, Falconieri N, Mitchell-Jones N, Bobdiwala S, Al-Memar M, et al. Posttraumatic stress, anxiety and depression following miscarriage and ectopic pregnancy: a multicenter, prospective, cohort study. Am J Obstet Gynecol. 2020 Apr;222(4):367.e1-367.e22. doi:10.1016/j.ajog.2019.10.102
7. Farren J, Jalmbrant M, Falconieri N, Mitchell-Jones N, Bobdiwala S, Al-Memar M, et al. Differences in post-traumatic stress, anxiety and depression following miscarriage or ectopic pregnancy between women and their partners: multicenter prospective cohort study. Ultrasound Obstet Gynecol. 2021 Jan;57(1):141–8. doi:10.1002/uog.23147

8. Gultekin L, Kusunoki Y, Sinko L, Cannon L, Abramoski K, Khan AG, et al. The Eco-Social Trauma Intervention Model. Public Health Nurs. 2019 Sep;36(5):709–15. doi:10.1111/phn.12619
9. Hu Y, Tang R, Li X, Wang X, Ma H, Heianza Y, et al. Spontaneous miscarriage and social support in predicting risks of depression and anxiety: a cohort study in UK Biobank. Am J Obstet Gynecol. 2024 Dec;231(6):655.e1-655.e9. doi:10.1016/j.ajog.2024.03.045
10. Farren J, Mitchell-Jones N, Verbakel J, Timmerman D, Jalmbrant M, Bourne T. The psychological impact of early pregnancy loss. Hum Reprod Update. 2018;24(6):731–49. doi:10.1093/humupd/dmy025
11. Bellhouse C, Temple-Smith M, Bilardi J. "It's just one of those things people don't seem to talk about…": women's experiences of social support following miscarriage: a qualitative study. BMC Womens Health. 2018;18(1):176. doi:10.1186/s12905-018-0672-3
12. Yuan H, Ren L, Ma Z, Li F, Liu J, Jin Y, et al. Network structure of PTSD symptoms in Chinese male firefighters. Asian J Psychiatry. 2022 Jun;72:103062. doi:10.1016/j.ajp.2022.103062
13. Wang Y, Chung MC, Wang N, Yu X, Kenardy J. Social support and posttraumatic stress disorder: A meta-analysis of longitudinal studies. Clin Psychol Rev. 2021 Apr;85:101998. doi:10.1016/j.cpr.2021.101998
14. Bellhouse C, Temple-Smith M, Watson S, Bilardi J. "The loss was traumatic… some healthcare providers added to the trauma": women's experiences of miscarriage. Women Birth. 2019;32(2):137–46. doi:10.1016/j.wombi.2018.06.006
15. Kiełek-Rataj E, Wendołowska A, Kalus A, Czyżowska D. Openness and Communication Effects on Relationship Satisfaction in Women Experiencing Infertility or Miscarriage: A Dyadic Approach. Int J Environ Res Public Health. 2020 Aug 7;17(16):5721. doi:10.3390/ijerph17165721
16. Zheng Q, Yin X, Liu L, Jevitt C, Fu D, Sun Y, et al. The influence of culture and spirituality on maternal grief following stillbirth in China: A qualitative study. Int J Nurs Stud. 2024 Dec;160:104863. doi:10.1016/j.ijnurstu.2024.104863
17. Bardos J, Hercz D, Friedenthal J, Missmer S, Williams Z. A national survey on public perceptions of miscarriage. Obstet Gynecol. 2015;125(6):1313–20. doi:10.1097/AOG.0000000000000859
18. World Health Organization. The unacceptable stigma and shame women face after baby loss must end [Internet]. Geneva: World Health Organization; 2019 [cited 2026 Apr 29]. Available from: https://www.who.int/news-room/spotlight/why-we-need-to-talk-about-losing-a-baby/unacceptable-stigma-and-shame
19. van den Berg M, Dancet E, Erlikh T, van der Veen F, Goddijn M, Hajenius P. Patient-centered early pregnancy care: a systematic review of quantitative and qualitative studies on the perspectives of women and their partners. Hum Reprod Update. 2018;24(1):106–18. doi:10.1093/humupd/dmx030
20. Qian J, Wang W, Sun S, Wu M, Liu L, Sun Y. Exploring interactions between women who have experienced pregnancy loss and obstetric nursing staff: a descriptive qualitative study in China. BMC Pregnancy Childbirth. 2022;22(1):450. doi:10.1186/s12884-022-04787-9

21. Levitt H, Bamberg M, Creswell J, Frost D, Josselson R, Suárez-Orozco C. Journal article reporting standards for qualitative primary, qualitative meta-analytic, and mixed methods research in psychology: The APA Publications and Communications Board Task Force Report. Am Psychol. 2018;73(1):26–46. doi:10.1037/amp0000151
22. McDonald SD, Calhoun PS. The diagnostic accuracy of the PTSD Checklist: A critical review. Clin Psychol Rev. 2010 Dec;30(8):976–87. doi:10.1016/j.cpr.2010.06.012
23. McDonald SD, Calhoun PS. The diagnostic accuracy of the PTSD Checklist: A critical review. Clin Psychol Rev. 2010 Dec;30(8):976–87. doi:10.1016/j.cpr.2010.06.012
24. Xu L, Ma Y, Yan Y. Relationship between alexithymia and post-traumatic stress disorder (PTSD) in patients with a history of early pregnancy loss (EPL) after frozen-thawed embryo transfer (FET): mediating effects of intolerance of uncertainty (IU). BMC Psychiatry. 2025 Nov 14;25(1):1153. doi:10.1186/s12888-025-07595-5
25. Connor KM, Davidson JR. Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). Depress Anxiety. 2003;18(2):76–82. doi:10.1002/da.10113
26. Zimet G, Dahlem N, Zimet S, Farley G. The Multidimensional Scale of Perceived Social Support. J Pers Assess. 1988;52(1):30–41. doi:10.1207/s15327752jpa5201_2
27. Wang J, Chen Y, Wang Y, Liu X. Revision of the posttraumatic growth inventory and testing its reliability and validity. J Nurs Sci. 2011;26(14):26–8. doi:10.3870/hlxzz.2011.14.026
28. Tedeschi R, Calhoun L. The Posttraumatic Growth Inventory: measuring the positive legacy of trauma. J Trauma Stress. 1996;9(3):455–71. doi:10.1002/jts.2490090305
29. Li, X, Yang, X; et al. The Posttraumatic Growth Inventory: Chinese simplified 20-item version – translation and validation. Acta Psychol Sin [Internet]. 2008;40(5). Available from: http://journal.psych.ac.cn/xlxb
30. Kahn JH, Hessling RM. Measuring the Tendency to Conceal Versus Disclose Psychological Distress. J Soc Clin Psychol. 2001 Mar;20(1):41–65. doi:10.1521/jscp.20.1.41.22254
31. Cheung SK, Sun SYK. Assessment of Optimistic Self-Beliefs: Further Validation of the Chinese Version of the General Self-Efficacy Scale. Psychol Rep. 1999 Dec;85(3_suppl):1221–4. doi:10.2466/pr0.1999.85.3f.1221
32. Tedeschi RG, Calhoun LG. The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. J Trauma Stress. 1996;9:455–71. doi:10.1007/BF02103658
33. Vignato J, Inman M, Patsais M, Conley V. Computer-Assisted Qualitative Data Analysis Software, Phenomenology, and Colaizzi's Method. West J Nurs Res. 2022 Dec;44(12):1117–23. doi:10.1177/01939459211030335
34. Bonanno G. Loss, trauma, and human resilience: have we underestimated the human capacity to thrive after extremely aversive events? Am Psychol. 2004;59(1):20–8. doi:10.1037/0003-066X.59.1.20
35. Kiełek-Rataj E, Wendołowska A, Kalus A, Czyżowska D. Openness and communication effects on relationship satisfaction in women experiencing infertility or miscarriage: a dyadic approach. Int J

Environ Res Public Health. 2020;17(16):5721. doi:10.3390/ijerph17165721

36. Miethe S, Wigger J, Wartemann A, Fuchs FO, Trautmann S. Posttraumatic Stress Symptoms and its Association with Rumination, Thought Suppression and Experiential Avoidance: a Systematic Review and Meta-Analysis. J Psychopathol Behav Assess. 2023 Jun;45(2):480–95. doi:10.1007/s10862-023-10022-2
37. Alvarez-Calle M, Chaves C. Posttraumatic growth after perinatal loss: A systematic review. Midwifery. 2023 Jun;121:103651. doi:10.1016/j.midw.2023.103651
38. Shen Q, Fu Q, Mao C. Network analysis of posttraumatic stress and posttraumatic growth symptoms among women in subsequent pregnancies following pregnancy loss. BMC Psychiatry. 2024 Apr 9;24(1):266. doi:10.1186/s12888-024-05702-6
39. Abreu W, Brandão S, Brandão T, Prata AP, Silva R, Riklikiene O, et al. Post-traumatic stress symptoms, rumination, and posttraumatic growth in women with a traumatic childbirth experience. J Reprod Infant Psychol. 2025 May 25;1–18. doi:10.1080/02646838.2025.2497401
40. Jordan G, Ng F, Thomas R. How clinicians can support posttraumatic growth following psychosis: a perspective piece. Ir J Psychol Med. 2023 Feb 17;1–6. doi:10.1017/ipm.2023.7

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryGRAMMSchecklist.docx
- SupplementaryTableS1.docx